

planes that extend parallel to one another and said anode and cathode have a uniform thickness throughout.

REMARKS

Claims 1-8 are pending. By this Amendment, claim 1 is amended. No new matter is presented.

Applicants respectfully appreciate the courtesies extended to Applicants' representative by Examiner Parsons during the personal interview conducted on August 20, 2002.

Entry of this Amendment is proper under 37 CFR § 1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issues requiring further search and/or consideration on the part of the Examiner; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The Amendment is necessary and was not earlier presented because it is made in response to arguments raised in the Final Rejection. Entry of the Amendment is thus respectfully requested.

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,667,647 to Suga et al. (hereinafter "Suga") in view of U.S. Patent No. 4,243,508 to Dankese. Claims 6-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Suga in view of Dankese and U.S. Patent No. 5,401,371 to Oshima et al. (hereinafter "Oshima"). Applicants respectfully traverse these rejections.

Pending claim 1 recites a water electrolytic apparatus including a plurality of water electrolytic cells each having a solid polymer electrolyte membrane, an anode, and a cathode. The anode and the cathode are plate shaped and arranged on opposite sides of the electrolyte membrane, respectively. The water electrolytic cells are developed on a hypothetical plane and are electrically connected in series to one another, wherein each of the water electrolytic cell, electrolyte membrane, anode, and cathode are developed on respective hypothetical planes that extend parallel to one another and the anode and cathode have a uniform thickness throughout.

As noted above, pending claim 1 recites each anode and cathode are plate shaped. Page 4, lines 16 and 20 of the originally filed application provide support for the amended language. Plate is defined in *Webster's II New Riverside University Dictionary* as a flat, smooth, relatively thin, rigid body of uniform thickness. A copy of the page defining the term "plate" from the cited reference is attached hereto for the convenience of the Examiner. Furthermore, pending claim 1 recites the polymer electrolytic membrane is solid. Therefore, as explained in the Response dated April 30, 2002, due to the recited structure of the solid polymer electrolyte membrane, the plate shaped anode, and the plate shaped cathode in each water electrolytic cell being developed on respective hypothetical planes that extend parallel to one another, the thickness or height of the water electrolytic cell in a direction that is perpendicular to the hypothetical planes can be made relatively small, thereby making the thickness of the entire water electrolytic apparatus relatively small.

Dankese is applied merely for its teaching of an ion exchange membrane for use in an electrochemical apparatus. Therefore, the ion exchange membrane taught by Dankese replaces the ion exchange film 3 sandwiched by the box shaped wall structures 1,1 disclosed by Suga. However, the box shaped wall structures 1, 1 disclosed by Suga are not plate shaped such that they have a uniform thickness. In particular, each box shaped wall structure 1 disclosed by Suga includes an interior surface area 2 having a framework 4 that is coated with metal. The framework 4 projects from an interior surface of the box shaped wall structures 1 and is formed of a plurality of intersecting horizontal and vertical members which divide the interior space of the box shaped wall structures into a series of rectangular spaces. Notches 5 are formed in the horizontal and vertical members and are formed in a central portion of an edge of each interior wall forming the rectangular spaces which are formed by the horizontal and vertical members. See column 2, line 57 to column 3, line 1 and Figures 1(A) and 2 of Suga.

Furthermore, the framework disposed in the interior of each box-shaped wall structure forms an irregular surface which is coated with a metal film. See column 1, lines 45-47. The "irregular surface" of Suga is not plate shaped as are the anode and cathodes recited by pending claim 1.

Put simply, Suga does not disclose plate shaped anodes and cathodes having uniform thickness, but rather specifically discloses box shaped wall structures that have a varying thickness and are formed by the structural arrangement of the horizontal and

vertical members comprising the interior framework 4 and the notches 5 provided therein wherein the interior of each box-shaped wall structure has an irregular surface.

To establish *prima facie* obviousness of a claimed invention, all the claim features must be taught or suggested by the applied art of record (emphasis added). See In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See M.P.E.P. 2143.03.

As explained above, the invention recited by pending claim 1 of this application clearly states that the anode and cathode are plate shaped and have a uniform thickness. The claimed structural arrangement, when combined with the fact that the polymer electrolyte membrane is solid (i.e., flat and of a uniform thickness throughout), the overall thickness or height of the water electrolytic cell in a direction that is perpendicular to the hypothetical planes can be made relatively small, thereby making the overall thickness of the entire water electrolytic apparatus relatively small as well.

Suga clearly does not disclose or suggest the wall structures being plate shaped such that they have uniform thickness. Rather, as explained above, Suga discloses a somewhat intricate framework formed from connected horizontal and vertical members with notches formed therein resulting in an irregular surface. Therefore, the proposed Suga/Dankese combination does not disclose all of the claim features recited by pending claim 1.

Accordingly, the Office Action has not established a *prima facie* case of obviousness. For the above provided reasons, Applicants respectfully submit that pending claim 1 is not rendered obvious under 35 U.S.C. § 103 by Suga and Dankese

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Attorney Docket Number 107348-00096

as the applied references do not teach each claimed feature of rejected claim 1. Therefore, claim 1 should be deemed allowable.

Claims 2-8 depend from claim 1. If an independent claim is nonobviousness under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, it is respectfully submitted that these seven (7) dependent claims should be deemed allowable for the same reasons claim 1 is allowable, as well as for the additional subject matter recited therein.

Withdrawal of the rejections is respectfully requested.

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of claims 1-8, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

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In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 107348-00096.**

Respectfully submitted,
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Enclosures: Marked Up Version of Amended Claim 1
Page 900 from Webster's II New Riverside University Dictionary

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CMM:MO/cvj

Marked Up Version of Amended Claim 1

IN THE CLAIMS:

Please amend claim 1 as follows:

1. (Amended Twice) A water electrolytic apparatus comprising a plurality of water electrolytic cells each having a solid polymer electrolyte membrane, an anode, and a cathode, the anode and the cathode being plate shaped and arranged on opposite sides of said electrolyte membrane, respectively, ~~said~~ water electrolytic cells being developed on a hypothetical plane, and electrically connected in series to one another, wherein each of said water electrolytic cell, said solid polymer [electrolytic] electrolyte membrane, said anode, and said cathode are ~~developed on~~ respective hypothetical planes that extend parallel to one another, ~~and said anode and cathode have a uniform thickness throughout.~~

plasma-gene (plăz'mă-jēn') *n.* *Genetics.* A self-reproducing hereditary structure held to exist in cytoplasm and function in a manner analogous to, but independent of, chromosomal genes.

—*plasma-gene'ic* (-jēn'ik, -jēn'ik) *adj.*

plasma membrane *n. Biol.* The semipermeable membrane enclosing the cytoplasm of a cell.

plasma-pheresis (plăz'mă-fĕr'ē-sis) *n.* [PLASMA + *Gk. apharesis*, removal. —see *APHAERESIS*.] A process in which blood is withdrawn from a donor, the plasma and erythrocytes are separated from the blood, and the erythrocytes are returned to the circulatory system of the donor.

plasma-sol (plăz'mă-sôl', -sôl', -sôl') *n.* [PLASMA + *SOL* ⁴.] *Biol.* A state of cytoplasm that is more liquid than plasmagel.

plasmid (plăz'mid) *n.* [PLASM(A) + *-ID*.] A genetic element occurring outside of the nucleus that is present in the cytoplasm of some bacterial cells.

plasmin (plăz'min) *n.* A proteolytic enzyme in plasma that dissolves the clotting factors, esp. fibrin, in blood.

plasminogen (plăz'min'-ō-jen) *n.* The precursor to plasmin that is found in blood plasma and body fluids.

plasto- or **plasm-** *pref.* [< *PLASMA*] *Plasma* < *plasmin* >

plasmodesma (plăz'mō-dēz'mă) *n.* *pl. -des'ma* *also plasmodes'm* (plăz'mō-dēz'mă) *n.* *pl. -des'ma* or *-mas*. [PLASMO + *Gk. desma*, bond < *dein*, to bind.] *Biol.* A strand of living cytoplasm connecting two cells that are otherwise functionally separate.

plasmoidium (plăz'mōdē-əm) *n.* *pl. -di'-ə* (-dē'-ə) [NLat. *Plasmoidium* genus name: *PLASM(O)*. + *-odium*, resembling < *Gk. oīdēs*, -oid.] *1. A protozoan of the genus *Plasmodium*, which includes the parasites that cause malaria. 2. A naked multinucleate mass of protoplasm, as that characteristic of the vegetative phase of the slime molds.*

plasmolysis (plăz'mōlī-sis) *n.* Contraction or shrinkage of cellular protoplasm, esp. a plant cell, caused by water loss via osmosis.

—*plasmolytic* (-mōlīt'ik) *adj.* —*plasmolytic'ally* *adv.*

plasmolyze (plăz'mōlīz') *vt. & vi.* *-lyzed, -lyz-ing, -lyzea.* [*< PLASMOlySIS*.] To subject to or undergo plasmolysis.

plasmosome (plăz'mōsōm') *n.* A nucleolus.

-plast *suff.* [< *Gk. plastos*, molded < *plassein*, to mold.] An organized unit of living matter: *CELL* < *chloroplast* >

plaster (plăs'tər) *n.* [ME < OE < Lat. *emplastrum*, medical dressing < *Gk. emplastron* < *plassein*, to plaster on : *en*, in + *plassein*, to mold.] *1. A mixture of lime, sand, and water, occas. containing fiber, that hardens to a smooth solid and is used for coating walls and ceilings. 2. Plaster of Paris. 3. A pastelike mixture applied to a part of the body for healing or cosmetic purposes. 4. Mustard plaster. —*vt.* *-tered, -tered, -ters.* *1. To cover, coat, or repair with plaster. 2. To cover by or as if by pasting, esp. to cover conspicuously or excessively. 3. To apply a plaster to. 4. To cause to adhere to another surface. 5. To smooth down (e.g., hair) by applying a sticky substance. 6. Informal. a. To inflict heavy injury or damage on. b. To defeat decisively. —*plasterer n.* —*plaster'ery* *adj.***

plaster-board (plăs'tər-bōrd', -bōrd') *n.* *a.* A thin rigid board or sheet of layers of fiberboard or paper, usu. bonded to a plaster core and used to cover walls and ceilings.

plaster cast *n. 1.* A sculptured plaster of Paris cast, mold, or object. *2. CAST 11.*

plastered (plăs'tərd) *adj. Slang.* Drunk.

plastering (plăs'tər-ing) *n. 1.* The act of applying or working with plaster. *2. A coating or layer of plaster. 3. A resounding defeat.*

plaster of Paris *n.* [After Paris, France, where it was originally made.] Any of a group of gypsum cements, chiefly hemihydrated calcium sulfate, $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$, a white powder that forms a paste when mixed with water and hardens into a solid, used in making casts, molds, and sculpture.

plastic (plăs'tik) *adj.* [Lat. *plasticus* < *Gk. plastikos* < *plassein*, to mold.] *1. Capable of being formed or shaped: *PLIABLE*. 2. Relating to or dealing with shaping or modeling. 3. Giving form or shape to a substance. 4. Easily influenced: *IMPRESSIONABLE*. 5. Having sculptural qualities. 6. Made of plastic. 7. Physics. Capable of undergoing continuous deformation without rupture or relaxation. 8. *Biol.* Capable of building tissue: *FORMATIVE*. 9. Characterized by artificiality, pretension, or lack of originality < the plastic world of Madison Avenue hype> —*n.* Any of various complex organic compounds produced by polymerization, capable of being molded, extruded, cast into various shapes and films, or drawn into filaments used as textile fibers. —*plastic'ally* *adv.* —*plastic'ity* (plăs-tis'-tē) *n.**

plastic suff. [Gk. *plastikos*, fit for molding. —see *PLASTIC*.] Forming: growing: developing < *cytoplastic* >

plastic art *n. 1.* Three-dimensional art, as sculpture. *2. A visual art form, as a film or painting, as distinguished from a written art form, as literature or music.*

plastic explosive *n.* A pliable explosive material that adheres to various surfaces and is usu. detonated from a distance by a fuse or radio signal.

plasticize (plăs'ti-siz') *vt. & vi.* *-cized, -cizing, -cizes.* To make or become plastic. —*plasticization n.*

plasticizer (plăs'ti-sīz'ər) *n.* Any of various substances added to plastics or other materials to keep them pliable or soft.

plastic surgery *n.* Surgery to remodel, repair, or restore lost, injured, or defective body parts. —*plastic surgeon* *n.*

plastid (plăs'tid) *n.* [G. < Gk. *plastos*, molded < *plassein*, to mold.] *Any of several specialized cytoplasmic structures found in plant cells and some plantlike organisms and having various physiological functions. —*plastidial* (plăs'tidē-əl) *adj.**

plastique (plăs'tik') *n.* [Fr. < Lat. *plasticus*, plastic.] *A plastic explosive.*

plastomer (plăs'tō-mər) *n.* [Gk. *plastos*, molded + *(POLY)MER*.] *A hard, tough polymer, as acrylate resin.*

plastron (plăs'trōn) *n.* [OFr. < *Otal*. *piastrone*, aug. of *piastro*, thin metal plate. —see *PLASTER*.] *1. A breastplate worn under a coat of mail. 2. A protective breastplate worn by fencers. 3. A trimming on the front of a bodice. 4. The front of a formal dress shirt. 5. Zool. The ventral surface of the shell of a tortoise or turtle. —*plastral* (-träl) *adj.**

plasty suff. [Gk. *plastia* < *plastos*, molded < *plassein*, to mold.] *Plastic surgery < *dermatoplasty**

plasy suff. -PLASIA

plat (plat) *n.* [ME *plat* < fem. of *plat*, flat < VLat. **plattus* < Gk. *platys*.] *1. A flat, smooth, relatively thin, rigid body, of uniform thickness. 2. a. A sheet of rolled, hammered, or cast metal. b. A very thin plated coat or layer of metal. 3. a. A flat piece of metal forming a machine part. b. A flat piece of metal on which something is engraved. 4. a. A thin piece of metal used for armor. b. Armor made of plate. 5. a. A sheet of material, as metal, plastic, rubber, or paper-board, converted into a printing surface, as an electrolyte or stereotype. b. A print of engraved material, as a woodcut or lithograph, esp. when reproduced in a book. c. A full-page book illustration, often in color and printed on paper different from that used on the text pages. 6. A light-sensitive sheet of metal or glass on which a photographic image can be recorded. 7. A thin metallic or plastic support fitted to the gums to secure artificial teeth. 8. A horizontal member, capping the exterior wall studs, upon which the roof rafters rest in wood-frame construction. 9. *baseball*. Home plate. 10. a. A shallow dish on which food is served or from which it is eaten. b. *PLATEFUL*. 1. c. A main course served on a plate. 11. Service and food for one person at a meal <brunch at \$12 per plate> 12. Household articles, as hollowware, covered with a precious metal, as gold or silver. 13. A dish passed among a congregation for the collection of offerings. 14. a. An article of silver or gold, as a cup or bowl, offered as a prize. b. A contest, esp. a horse race, offering such a prize. 15. A thin cut of beef from the brisket. 16. *Anat. & Zool.* a. A thin flat layer or scale. b. A platelike organ or part. 17. *Electron.* a. An electrode, as in a storage battery or capacitor. b. The anode in an electron tube. 18. *Geol.* A large rigid section of the earth's lithosphere that floats upon the earth's mantle according to the theory of plate tectonics. —*vt. platted, platting, plated.* 1. To cover or coat with a thin layer of metal. 2. To armor. 3. To make an electrolyte or stereotype from. 4. To give a glossy finish to (paper) by pressing between metal sheets or rollers. —*platelike* *adj.**

platéau (plă-tō') *n.* *pl. -teaus or -teaux (-tōz')* [Fr. < OFr. *plat*, flat. —see *PLATE*.] *1. An elevated and fairly level expanse of land: *TABLELAND*. 2. a. A level or stage of growth or development. b. A relatively stable or quiescent period or state.*

plated (plăt'ēd) *adj.* *1. Coated with a thin layer of metal <silver-plated> 2. Covered or furnished with plates or sheets of metal, as armor. 3. Knitted with two kinds of yarn, one on the face and one on the back.*

plateful (plăf'fūl) *n., pl. -fuls.* *1. The amount that a plate will hold. 2. A generous portion of food.*

plate glass *n.* *A strong rolled and polished glass containing few impurities and used for mirrors and large windows.*

platelet (plăt'lēt) *n.* *A minute protoplasmic disk, smaller than a red blood cell, found in the blood of vertebrates and held to promote coagulation.*

plateen (plăt'n) *n.* [ME *plateyne*, paten < OFr. *platine*, metal plate < *plate*, plate. —see *PLATE*.] *1. One of the two flat members of the printing unit of a printing press that serves to position the paper and hold it against the inked type. 2. The roller on a typewriter against which the keys strike.*

plate proof *n.* *A proof taken from a master printing plate.*

plate tectonics *n. (sing. in number).* *1. A branch of geology concerned with seismic activity and continental movement, based on the theory that the earth's surface is composed of a small number of large, semirigid sections that float across the mantle, with seismic activity and volcanism occurring primarily at the junction of these sections. 2. The dynamics of plate movement.*

plat-form (plăt'fōrm') *n.* [OFr. *plate-forme*, diagram: *plate*, flat + *forme*, form.] *1. A floor or horizontal surface raised above the level of the adjacent area, as a landing alongside railroad tracks or a stage*

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